1. A communication system, comprising:

a span of Phosphate-doped optical fiber configured to transport optical signals; and

a continuous wavelength light system coupled to the span of Phosphate-doped optical fiber and configured to pump continuous wavelength light onto the span of Phosphate-doped optical fiber to generate a total gain bandwidth of at least 120 nm.

2. The communication system of claim 1 wherein the span of Phosphate-doped optical fiber comprises a span of Phosphate-Germanium co-doped optical fiber.

3. The communication system of claim 1 wherein the continuous wavelength light system is configured to pump continuous wavelength light onto the span of Phosphate-doped optical fiber to generate a first gain band having a bandwidth of at least 60 nm and a second gain band having a bandwidth of at least 60 nm.

4. The communication system of claim 3 wherein the first gain band and the second gain band are separated by a wavelength gap, and wherein the communication system further comprises:

an optical amplifier configured to amplify the wavelengths in the wavelength gap.

5. The communication system of claim 1 wherein the continuous wavelength light system is configured to pump the continuous wavelength light onto the span of Phosphate-doped optical fiber to generate a total gain bandwidth of about 200 nm.

6. The communication system of claim 1 wherein the continuous wavelength light system is configured to forward pump the continuous wavelength light onto the span of Phosphate-doped optical fiber.

7. The communication system of claim 1 wherein the continuous wavelength light system is configured to backward pump the continuous wavelength light onto the span of Phosphate-doped optical fiber.

8. The communication system of claim 1 wherein the continuous wavelength light system is configured to forward pump and backward pump the continuous wavelength light onto the span of Phosphate-doped optical fiber.

9. The communication system of claim 1 wherein the continuous wavelength light system comprises a continuous wavelength Raman fiber laser.

10. The communication system of claim 1 wherein the continuous wavelength light system is configured to pump the continuous wavelength light onto the span of Phosphate-doped optical fiber to generate a total gain bandwidth of at least 120 nm that includes at least the C-band.

11. The communication system of claim 1 wherein the continuous wavelength light system is configured to pump the continuous wavelength light onto the span of Phosphate-doped optical fiber to generate a total gain bandwidth of at least 120 nm that includes at least the C-band and the L-band.

12. The communication system of claim 1 wherein the continuous wavelength light system is configured to pump the continuous wavelength light onto the span of Phosphate-doped optical fiber to generate a total gain bandwidth of at least 120 nm that includes at least the C-band, the L-band, and the S-band.

13. The communication system of claim 1 wherein the continuous wavelength light system is configured to pump the continuous wavelength light onto the span of Phosphate-doped optical fiber to generate a total gain bandwidth of at least 120 nm that does not include at least one of the C-band, the L-band, and the S-band.

14. A method of operating a communication system comprising a continuous wavelength light system and a span of Phosphate-doped optical fiber, the method comprising the steps of:

transporting optical signals on the span of Phosphate-doped optical fiber; and

pumping continuous wavelength light on the span of Phosphate-doped optical fiber with a continuous wavelength light system to generate a total gain bandwidth of at least 120 nm.

15. The method of claim 14 wherein the span of Phosphate-doped optical fiber comprises a span of Phosphate-Germanium co-doped optical fiber.

16. The method of claim 14 wherein the step of pumping continuous wavelength light on the span of Phosphate-doped optical fiber with a continuous wavelength light system comprises:

pumping the continuous wavelength light onto the span of Phosphate-doped optical fiber to generate a first gain band having a bandwidth of at least 60 nm and a second gain band having a bandwidth of at least 60 nm.

17. The method of claim 16 wherein the first gain band and the second gain band are separated by a wavelength gap, and the method further comprises:

amplifying the wavelengths in the wavelength gap with an optical amplifier.

18. The method of claim 14 wherein the step of pumping continuous wavelength light on the span of Phosphate-doped optical fiber with a continuous wavelength light system to generate a total gain bandwidth of at least 120 nm comprises:

pumping the continuous wavelength light on the span of Phosphate-doped optical fiber with the continuous wavelength light system to generate a total gain bandwidth of about 200 nm.

19. The method of claim 14 wherein the step of pumping continuous wavelength light on the span of Phosphate-doped optical fiber comprises:

forward pumping the continuous wavelength light on the span of Phosphate-doped optical fiber.

20. The method of claim 14 wherein the step of pumping continuous wavelength light on the span of Phosphate-doped optical fiber comprises:

backward pumping the continuous wavelength light on the span of Phosphate-doped optical fiber.

21. The method of claim 14 wherein the step of pumping continuous wavelength light on the span of Phosphate-doped optical fiber comprises:

backward and forward pumping the continuous wavelength light on the span of Phosphate-doped optical fiber.

22. The method of claim 14 wherein the continuous wavelength light system comprises a continuous wavelength Raman fiber laser.

23. The method of claim 14 wherein the step of pumping continuous wavelength light on the span of Phosphate-doped optical fiber with a continuous wavelength light system comprises:

pumping the continuous wavelength light on the span of Phosphate-doped optical fiber with the continuous wavelength light system to generate the total gain bandwidth in at least the C-band.

24. The method of claim 14 wherein the step of pumping continuous wavelength light on the span of Phosphate-doped optical fiber with a continuous wavelength light system comprises:

pumping the continuous wavelength light on the span of Phosphate-doped optical fiber with the continuous wavelength light system to generate the total gain bandwidth in at least the C-band and the L-band.

25. The method of claim 14 wherein the step of pumping continuous wavelength light on the span of Phosphate-doped optical fiber with a continuous wavelength light system comprises:

pumping the continuous wavelength light on the span of Phosphate-doped optical fiber with the continuous wavelength light system to generate the total gain bandwidth in at least the C-band, the L-band, and the S-band.

26. The method of claim 14 wherein the step of pumping continuous wavelength light on the span of Phosphate-doped optical fiber with a continuous wavelength light system comprises:

pumping the continuous wavelength light on the span of Phosphate-doped optical fiber with the continuous wavelength light system to generate the total gain bandwidth outside of at least one of the C-band, the L-band, and the S-band.